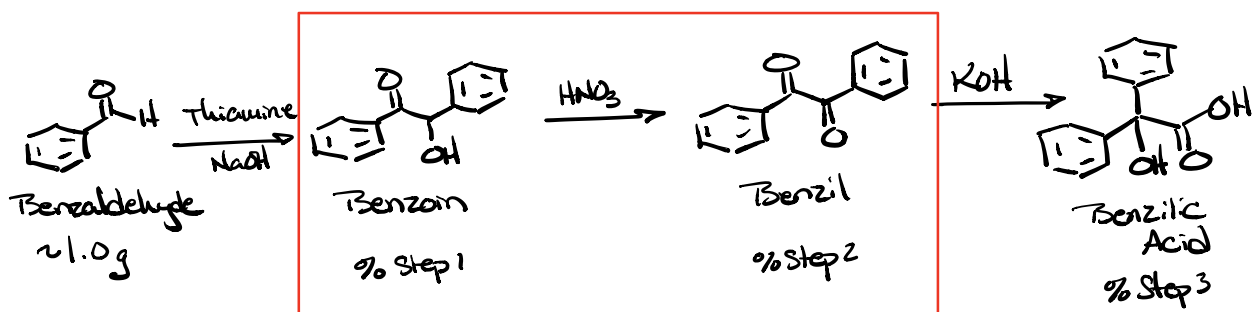
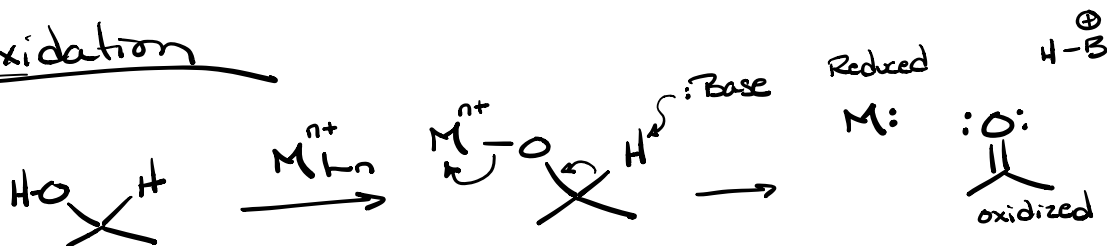


Multistep synthesis of Benzilic Acid



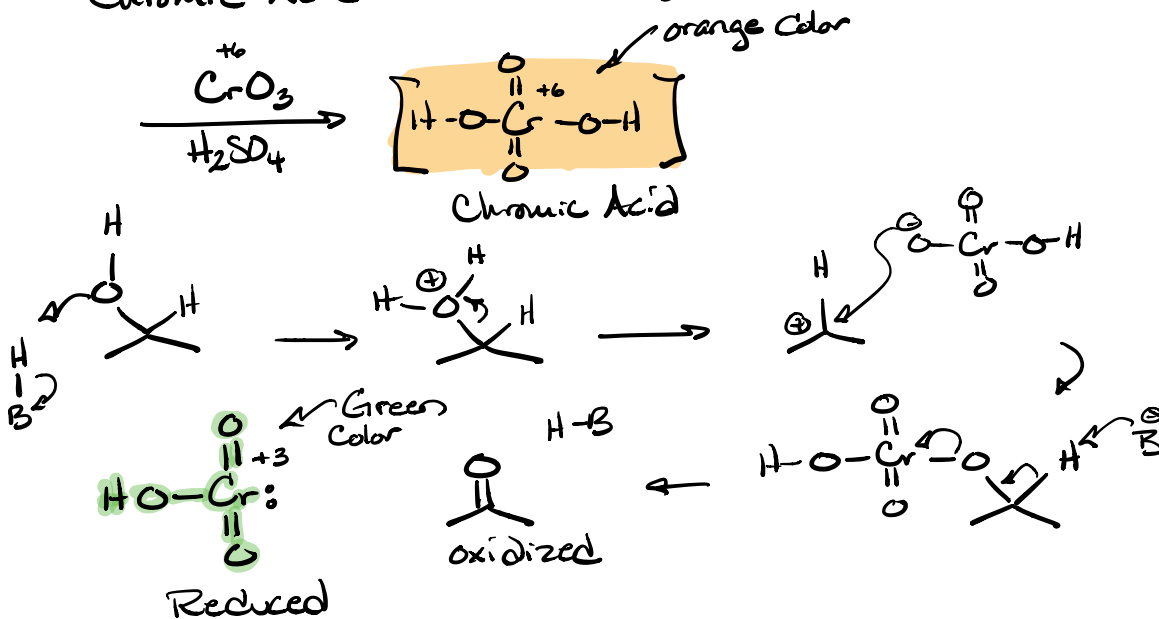
$$\%1 \times \%2 \times \%3 \times 100 = \% \text{ yield}$$

oxidation



Strong oxidizing Agent

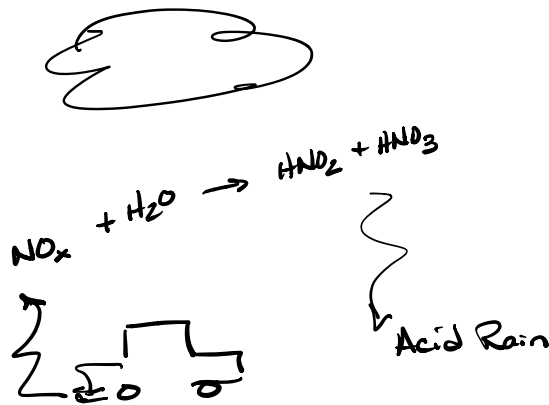
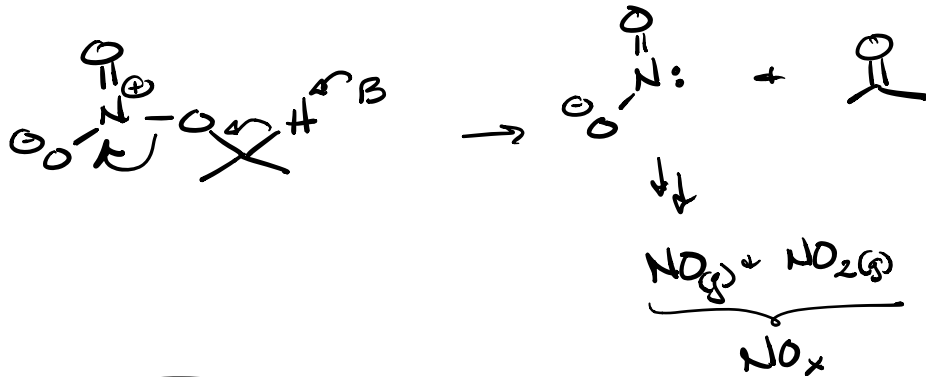
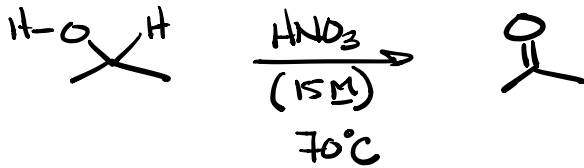
Chromic Acid - Jones' Reagent



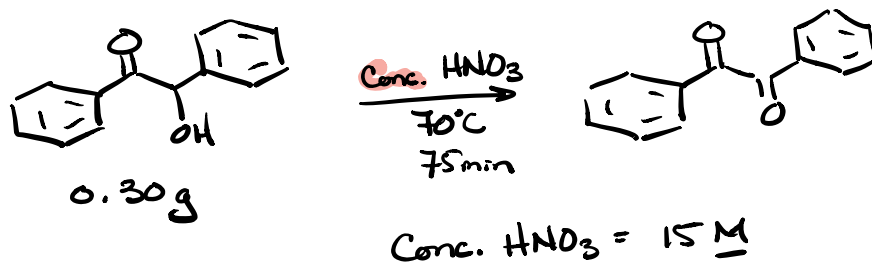
Cr^{6+} hexavalent Chromium (Known Carcinogen)

Cr^{3+} Chromic ion } not Carcinogen
 Cr^{2+} Chromous ion }

Oxidation using HNO_3

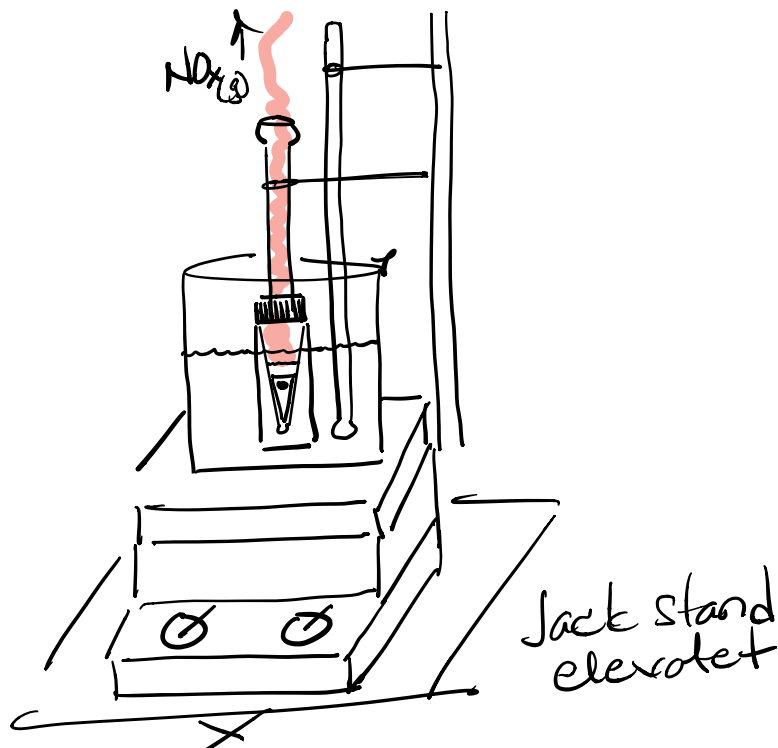


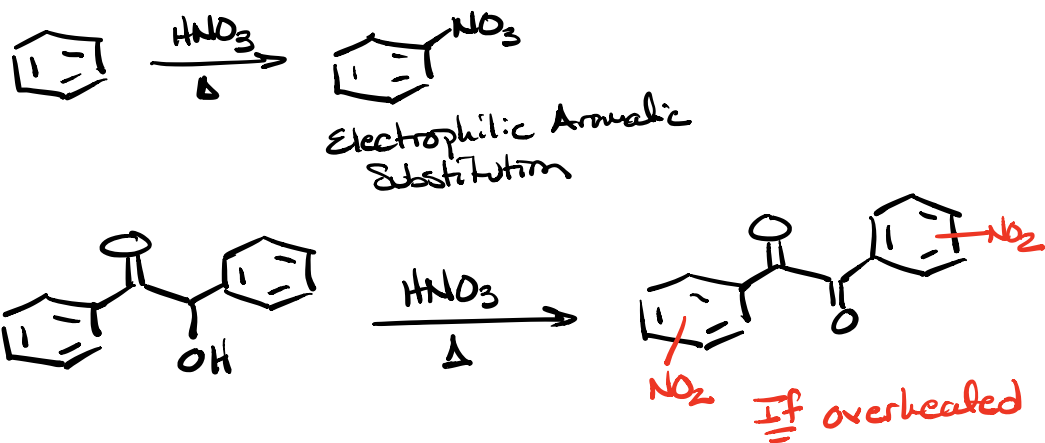
Red/Brown gas
forms $\text{HNO}_2 + \text{HNO}_3$
when inhaled



Reaction

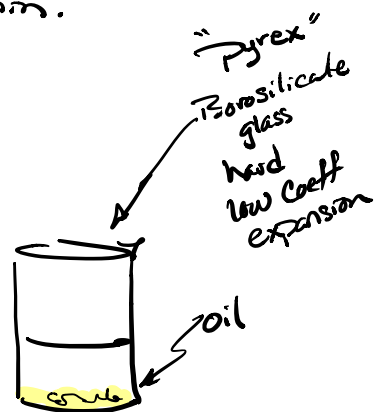
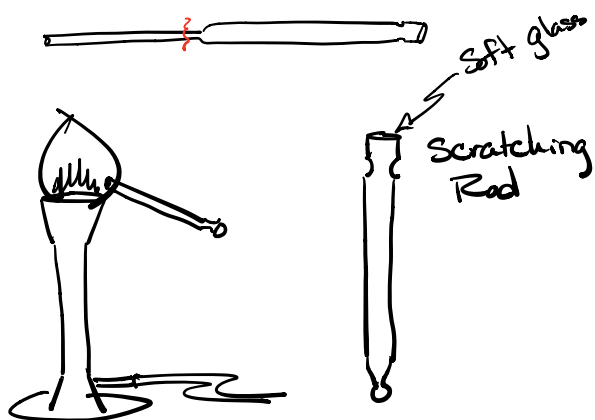
- weigh out 0.30 g Benzoin & place in a 5-mL Conical vial
- Add Spin vane & Condenser
- Setup a water bath & heat to 70°C ± 5°C
- Add 1.5 mL Conc. HNO₃ to reaction & heat for 75 min @ 70°C ± 5°C

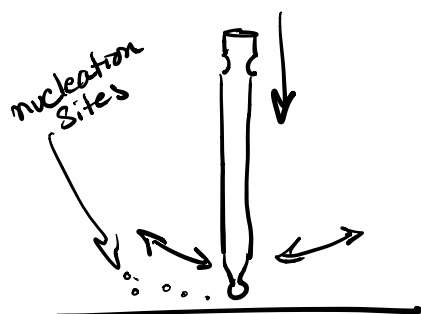




workup

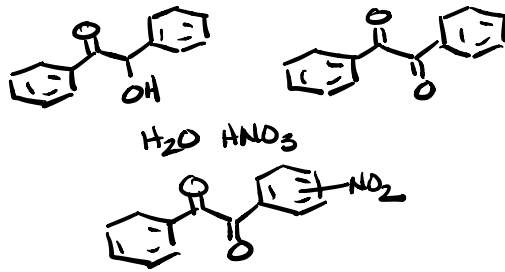
- Cool to room temp
- Disconnect air Condenser in Fume hood
- Transfer Contents of Reaction to a beaker w/ 4 mL 0°C DI H₂O
- Rinse Conical vial & Spin vane w/ DI & add to beaker
- Ice bath beaker for 10-15 min. (scratch if needed)



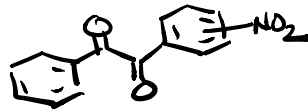


- Filter on Hirsch funnel & Rinse w/ Sub DI
- Recrystallize from 95% EtOH
- mass for % yield
- mp
- FTIR

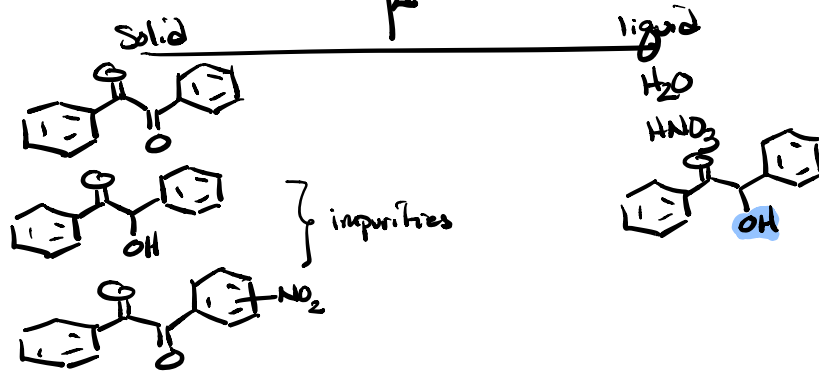
Separation Scheme



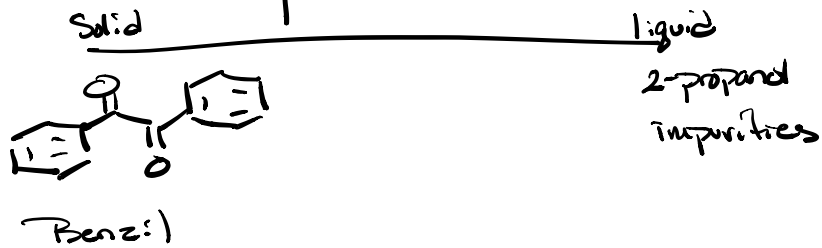
H₂O HNO₃

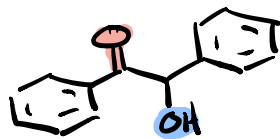


H₂O

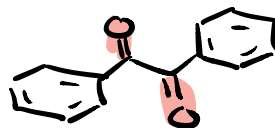


2-propanol (Recrystallization)





Benzoin



Benzil

mp

H-bonding
~130°C

dipole-dipole
~98°C

IR

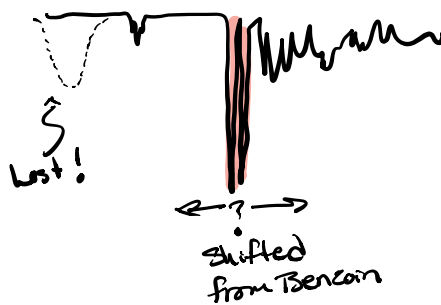
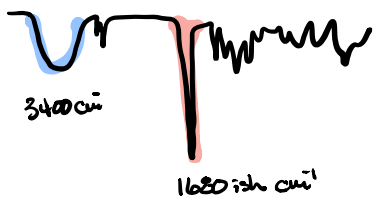
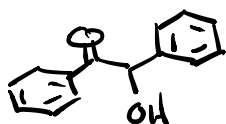


Table of Reagents

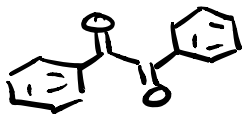


Thiourea · HCl

EtOH



Conc. HNO₃



8 M KOH (aq)